

REMARKS

Claims 85-122 remain in this application. Claims 45-60, 62-77, and 79-84 have been cancelled without prejudice in order to de-fragment the claims. Claims 85-122 have been added. The new claims are supported by the specification and no new matter has been added. The Applicants respectfully request reconsideration of this application in view of the above amendments and the following remarks.

35 U.S.C. §112 Rejection

The Examiner has rejected claims 45-49 under 35 U.S.C §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

Claims 45-49 have been cancelled. Claim 45 approximately corresponds to new claim 85. Applicants respectfully submit that new claim 85 complies with the requirements of 35 U.S.C. §112, second paragraph.

35 U.S.C. §103(a) Rejection – Usami in view of Havemann and Doo

The Examiner has rejected claims 45 – 49 and 63 - 73 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,222,269 issued to Usami (hereinafter referred to as “Usami”) in view of U.S. Patent No. 5,751,066 issued to Havemann (hereinafter “Havemann”) and U.S. Patent No. 4,153,988 issued to Doo (hereinafter “Doo”). The Applicants respectfully submits that the present claims are allowable over any combination of Usami, Havemann, and Doo.

Claims 45-49 and 63 - 73 have been cancelled without prejudice. The Applicants respectfully submit that new claim 85 has limitations that are similar to those of former claim 45. **Claim 85** recites at least, “*patterning the mask layer such that the first and*

second power interconnect lines and a first portion of the patterned first layer are covered, and the third signal interconnect line and a second portion of the patterned first layer are uncovered” and “depositing a second layer of a second dielectric material adjacent to the third signal interconnect line, the second dielectric material having a smaller dielectric constant than the first dielectric material”.

Usami and Havemann do not teach or suggest: (1) power lines, (2) patterning such that power lines are covered and a signal line is uncovered, nor (3) depositing a smaller dielectric constant material between signal lines than between a power line and a signal line.

The Examiner has admitted that Usami lacks specifying that the plurality of interconnect lines include power interconnect lines (first and second) and signal interconnect lines (third). The Applicants respectfully agree. There is absolutely no mention of power lines in Usami. Furthermore, there is absolutely no mention of power lines in Havemann. Usami and Havemann simply do not discuss power lines or power driver noise. Instead, Usami and Havemann are limited to signal lines. There is absolutely no mention whatsoever that the disclosure has relevance to power lines or power driver noise.

This being the case, it is not surprising that there is also no teaching or suggestion of patterning such that power lines are covered and signal lines are uncovered. There is also no teaching or suggestion of depositing materials with different dielectric constants adjacent to signal lines and power lines. Accordingly, Usami and Havemann clearly do not teach or suggest the limitations of claim 45.

The Examiner has proposed modifying Usami based on Havemann and Doo in order to reject claim 45. The Examiner has stated that Doo teaches that increasing the

capacitance of a power line will reduce driver noise. The Examiner has further stated that:

"In view of Havemann and Doo, it would have been obvious to one of ordinary level of skill in the art to modify Usami by utilizing the interconnect lines "3" for a combination of power lines and signal lines on the same level of metallization because the two dielectric materials ("4" and "5") can be readily utilized to increase the capacitance between power lines and to decrease the parasitic capacitance between signal lines. In other words, Usami and Havemann clearly indicate that signal lines will benefit from the low-k material wherein both Usami and Havemann perform dedicated process steps for the very purpose of locating low-k material between interconnect lines that are clearly intended for signal lines; and given the knowledge generally available regarding capacitance of signal lines and power lines (as shown by Doo), one of ordinary level of skill in the art would have readily recognized that the interconnect lines with the high-k material therebetween are ideal for power lines."

As an initial matter, the Applicants submit that it is not appropriate to use the interconnect line "3" for a combination of power lines and signal lines, as proposed by the Examiner. The discussion in Usami makes it clear that the interconnect lines 3 are limited to signal lines. Usami repeatedly discusses that a low dielectric constant insulator be used in a narrowly-spaced region between adjacent interconnect lines and that a higher dielectric constant insulator be used in a widely-spaced region between adjacent interconnect lines. This clearly limits the interconnect lines 3 to signal lines. Using a low dielectric constant insulator in a region between narrowly-spaced power lines would exacerbate driver noise problems. Accordingly, utilizing the interconnect line "3" for a combination of power and signal lines, as proposed by the Examiner, is believed to be inappropriate.

As a further matter, the Applicants respectfully disagree with the modification of Usami and/or Havemann and with the obviousness rejection because there is no teaching, suggestion or motivation to modify the references as proposed by the Examiner.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some teaching, suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The modification proposed by the Examiner is allegedly based on what is known by one of ordinary level of skill in the art. However, it is not known to reduce driver noise of power lines and reduce parasitic capacitance of signal lines in a given interconnect level by depositing a different dielectric material next to a signal interconnect line than a dielectric material having patterned therein power interconnect lines. Usami and Havemann do not discuss power lines or driver noise. Doo does not discuss using different materials between signal lines and power lines. Accordingly, the Examiner has not established a prior art teaching, suggestion, or motivation that it would be desirable to deposit a different dielectric material next to a signal interconnect line than a dielectric material having patterned therein power interconnect lines.

The Examiner's conclusion appears to be based on impermissible hindsight reasoning. Only using 20-20 hindsight, with the Applicant's own disclosure serving as a guide or roadmap, would the Examiner concluded that different materials may be used in

the same level of interconnect to reduce power line driver noise and signal line parasitic capacitance. Certainly this is not taught or suggested in any of the cited art references taken alone or in combination. It is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Additionally, an obviousness rejection cannot be predicated on the supposition that one of ordinary skill would have the capabilities to arrive at the invention. As discussed in *In re Lindell*, 385 F.2d 453 155 USPQ 521 (C.C.P.A. 1967) 1301-1302:

“At best, the Examiner’s comments regarding obviousness amount to an assertion that one of ordinary skill in the relevant art would have been able to arrive at appellant’s invention because he had the necessary skills to carry out the requisite process steps. This is an inappropriate standard for obviousness ...That which is within the capabilities of one skilled in the art is not synonymous with obviousness...That one can reconstruct and/or explain the theoretical mechanisms of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention.”

As was stated in *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984), “The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification.” (emphasis added). Therefore, it is simply improper to add to either Usami or Havemann features for which they have no interest or need, since they do not discuss power lines or power driver noise.

For at least these reasons, claim 85 is believed to be allowable over any combination of Usami, Havemann, and Doo. **Claims 86-89** depend from claim 85 and are believed to be allowable therefor as well as for the recitations independently set forth therein.

Claim 63 has been cancelled. Claim 63 approximately corresponds to new claim 102. **Claim 102** is believed to be allowable for reasons similar to those discussed above for claim 85. **Claims 103-107** depend from claim 102 and are believed to be allowable therefor as well as for the recitations independently set forth therein.

Claim 69 has been cancelled. Claim 69 approximately corresponds to new claim 108. **Claim 108** is believed to be allowable for reasons similar to those discussed above for claim 85. **Claims 109-112** depend from claim 108 and are believed to be allowable therefor as well as for the recitations independently set forth therein.

35 U.S.C. §103(a) Rejection –Havemann in view of Doo

The Examiner has rejected claims 50 – 60, 62, 74 – 77 and 79 – 84 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,751,066 issued to Havemann (hereinafter referred to as “Havemann”) in view U.S. Patent No. 4,153,988 issued to Doo (hereinafter “Doo”). The Applicants respectfully submit that the present claims are allowable over any combination of Havemann and Doo.

Claim 50 has been cancelled. Claim 50 approximately corresponds to new claim 90. **Claim 90** is believed to be allowable for reasons similar to those discussed above for claim 85. **Claims 91-95** depend from claim 90 and are believed to be allowable therefor as well as for the recitations independently set forth therein.

Claim 56 has been cancelled. Claim 56 approximately corresponds to new claim 96. **Claim 96** is believed to be allowable for reasons similar to those discussed above for

claim 85. **Claims 97-101** depend from claim 96 and are believed to be allowable therefor as well as for the recitations independently set forth therein.

Claim 74 has been cancelled. Claim 74 approximately corresponds to new claim 113. **Claim 113** is believed to be allowable for reasons similar to those discussed above for claim 85. **Claims 114-122** depend from claim 113 and are believed to be allowable therefor as well as for the recitations independently set forth therein.

Conclusion

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

Request For Telephone Interview

The Examiner is invited to call Brent E. Vecchia at (303) 740-1980 if there remains any issue with allowance of the case.

Request For An Extension Of Time

The Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

Charge Our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,
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